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See page 23

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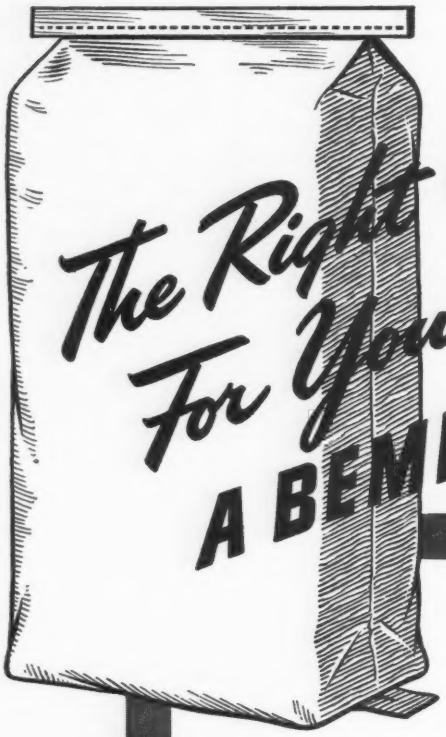

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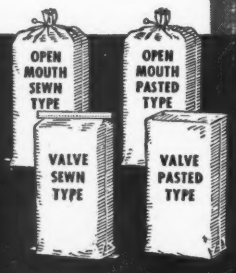

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AMERICAN FERTILIZER

"That man is a benefactor to his race who makes two blades of grass to grow where but one grew before."

Vol. 104 MARCH 9, 1946 No. 5

Developments by the Bureau of Plant Industry

Robert M. Salter, Bureau Chief, Reports Results of Years' Experimental Work in Soils and Fertilizers

IN HIS report on the work of the Bureau of Plant Industry, Soils and Agricultural Engineering, U. S. Department of Agriculture, Robert M. Salter, Chief of the Bureau, summarizes a most comprehensive program being carried out to develop new agricultural methods. New seed varieties, new insecticides, new plant diseases and their remedies. Of particular interest to the fertilizer industry is the section devoted to soils and fertilizers, in which the following projects are described.

Soils and Fertilizers

Investigations of soil-management practices have been concerned with variations in cropping systems, use of cover crops, green manuring, mulching, liming, fertilizing, and various cultural practices for their application or for the development of new methods used in successful agriculture. Special studies have been made on chemical and physical changes in soils; soil-fertilizer relations to plant nutrition; the functions of organic matter and its influence on soil fertility; and relations of microorganisms to other soil constituents, to cultural practices, and to factors affecting soil productivity.

Studies relating to the production and use of fertilizers included: The development or improvement of processes for the economic production of nitrogen compounds, phosphates, potash, and other fertilizer materials, and mixed fertilizers; reactions between components of mixed fertilizers that influence physical properties or crop-producing powers; preparation of new fertilizer materials or development of new sources; methods of analysis; fertilizer tests to determine crop responses and efficiency in production; and the basic reactions by which plants obtain and utilize plant nutrients.

Nitrogen Multiplies North Carolina Corn Yields

Doubling the corn yield in North Carolina in the next ten years does not seen to be an unreasonable goal in the light of fertilizer experiments made at eleven locations in the Coastal Plain and Piedmont regions. The results clearly indicate that corn yields can be increased far beyond the present levels at a cost that farmers could well afford to pay.

The largest increase due to fertilization was 88 bushels per acre above the check plot (under good moisture conditions), and the smallest increase was 32 bushels per acre (under droughty conditions). All plots in the experiment had been fertilized with 80 pounds P_2O_5 and 80 pounds K_2O per acre at a cost of about $10.00. The high yields were obtained in Hoke County on a sandy loam soil. Without supplemental nitrogen, 19 bushels of corn per acre were obtained. With 120 pounds of nitrogen at a cost of about $20.00 per acre the total yield was 107 bushels, an increase of 88 bushels per acre. Intermediate applications of nitrogen, from 20 to 80 pounds per acre, gave corresponding yield increases. The higher rates of fertilization added about $30.00 per acre to the cost of production. Where the 107-bushel yields were obtained each dollar spent for fertilizer resulted in more than 2.9 bushels additional corn per $1.00 spent for fertilizer.

If fertilizer were applied every year or regularly in rotations the soil could be maintained at a high nutrient level with smaller applications because of residual effects from

one year to the next. An increase of 10 bushels of corn per acre in North Carolina would make up the entire feed-grain deficit of the State, and an increase of 20 bushels per acre, or doubling the present average yield for the State, would be of untold value in developing its livestock industry.

Soil Depletion in Northern Great Plains Shown

Recently completed cooperative studies of soils from the long-time crop rotation and cultural experiments at the Mandan, N. D., Dry Land Agriculture Station show that soil fertility is being depleted under the cropping systems generally followed in this area. The magnitude of the depletion is reflected by the changes in carbon and nitrogen content of the soil. Continuous cropping of wheat, oats, barley, and corn showed losses of carbon from 17 to 39.5 per cent and of nitrogen from 15 to 37 per cent. These losses were smaller in all cases than in those where continuous cropping alternated with fallow. With alternate fallow the carbon losses varied from 27 to 44 per cent and nitrogen losses from 25 to 41 per cent. A rotation of corn, wheat, and oats without manure gave a 38.4 per cent carbon loss and a 30 per cent nitrogen loss. With manure the loss in carbon was only 5 per cent and there was a nitrogen increase of 2 per cent. Only where manure was used was no depletion of the soil evidenced.

Defluorinated Phosphate Rock Manufactured

Defluorinated phosphate rock was manufactured commercially for the first time this year, the outcome of work carried on over a number of years. Heating phosphate rock with silica in the presence of steam at temperatures of 1400 degrees to 1600 degrees C., it had been shown, volatilizes the fluorine and converts the phosphorus into a readily available form. The commercial product, manufactured by private industry and by the Tennessee Valley Authority, is suitable for use as a fertilizer and as a phosphorus supplement in feeds for livestock.

Fertilizer Consumption Related to Farmer Income

A study of the relation of expenditures for fertilizers to farmer income was made for the period from 1911 to 1943, inclusive. The expenditures over this period ranged from $111,000,000 to $442,000,000. It was found that 93 per cent of all the differences in expenditures is accompanied by corresponding variations in (1) cash income from crops and Government payments in the previous year, (2) cash income from crops in the current year, and (3) the proportion of the previous year's income remaining after expenses of production have been deducted. A formula was worked out for expression of this relation. Using this, it was estimated in the spring of 1943 that farmers would spend $439,000,000 in the calendar year 1944. The amount actually spent was about $450,000,000. The study indicates the importance of the previous year's income, but this is not always of equal importance in different areas. For instance, it seems to be of less than average importance in Pennsylvania and of exceptionally large importance in South Carolina.

Nitrogen Increases Yield of Tung Oil

Nitrogen fertilizers have been found to increase greatly the production of tung oil per tree or per acre when properly applied, even in well-cultivated orchards in which leguminous cover crops are grown. Experiments show that the annual application in March of nitrogen fertilizer carrying 35 to 70 pounds of actual nitrogen per acre, depending on the soil and the age of trees, results in an increase of 45 to 185 per cent in the production of tung oil. In all cases it has been found that this increase is due to (1) increase in growth of the trees, which gives a larger leaf area having a darker green color; (2) increase in number of fruiting buds per tree; (3) increase in average number of pistillate flowers and fruits that develop from each fruiting bud; (4) increase in percentage of kernel in the whole fruit, such that the percentage of oil in a given weight of whole fruit is increased, notwithstanding the slight decrease in percentage of oil in the nut kernels. Tung trees must, therefore, be liberally fertilized with nitrogen to obtain maximum fruit yields and lowest cost per pound of oil.

Chrome Leather for Fertilizer Use Restricted by CPAO Order

The Civilian Production Administrator has issued an order, M-390, which forbids the use of natural colored cattle chrome stock for fertilizer tankage or for any other use except the production of glue. The explanation given is that the leather shortage has caused a drop in the supply of glue needed for defense, for private account and for export. Where this order works an extreme hardship, an appeal may be made, which should be sent to Mrs. Marion A. Barton, Room 4030, Social Security Building, Washington 25, D. C.

The Fertilizer Rate Problem*

By R. E. STEPHENSON

Soils Department, Agricultural Experiment Station, Corvallis, Oregon

A FARMER reported 100 pounds of sulphate of ammonia used on onions; another reported 100 pounds of sodium nitrate used on mint. In neither case was there any appreciable response, and crop growth was entirely unsatisfactory—so much so that assistance was sought to diagnose the trouble and explain the unsatisfactory growth and harvest.

In both cases, whatever if anything else may have been wrong, the fertilizer program was inadequate. In both cases a complete fertilizer should have been used, and a sulphur carrier should have been included for the particular area. Considering nitrogen alone, the 20 pounds supplied the onions could not contribute a very great increase in growth. A 300-bushel yield would have 40 pounds of nitrogen in the bulbs and at least that much in the tops. Crops seldom recover more than 75 per cent of the nitrogen supplied in the fertilizer, and a 50 per cent recovery is reasonable. A 10 to 15-pound nitrogen recovery where 80 or more is needed could not be expected to cause much increase in yield. The mint crop was still more inadequately fertilized.

These are isolated cases but are typical of much fertilizer practice. The reason probably is lack of knowledge of plant requirements and perhaps partly lack of well-established faith in commercial fertilizers. In some cases, no doubt, disappointing experiences may have been to blame—at least there was not a full understanding of the needs of a growing crop or the means of meeting those needs.

In fertilizer studies with cover crops it was found that 100 pounds of nitrogen in the fertilize (not 100 pounds of fertilizer) when broadcast on the surface in early spring (February) gave excellent results. Use of 50 pounds of nitrogen usually gave appreciable increases, but 25 pounds of nitrogen could seldom be detected either in the appearance of the cover crop or in the weighed amount of growth. A farmer using the light rate probably would have considered the fertilizer of no value, as was true because of its inadequacy. The farmer who used 100 pounds of nitrogen would have been well pleased with the results.

For Crop Increases

Crop increases cannot come from nothing. As one observer states, to produce a big increase from so little fertilizer is an impossibility that would be quickly recognized with a little study of what takes place in plant growth where fertilizers are used. In the first place, the crop, the bacteria and fungi of the soil, and the soil itself compete for nutrients that are present or added as fertilizer. In the case of phosphates, soil fixation may commonly prevent two-thirds or three-fourths of the applied phosphorus from contributing to plant growth. In the use of fertilizer, this fact must be taken into consideration. A 10-ton tomato crop needs about 35 pounds of phosphoric acid for growth. But if the soil gets 105 pounds and the grower expects to add 10 pounds to his yield with fertilizer, there would need to be at least 140 pounds of phosphoric acid applied per acre. This is equivalent to 700 pounds of 20 per cent superphosphate.

Nitrogen is the most evanescent element applied to the soil. It leaches readily and is likely to be lost in the drainage. Gaseous forms of nitrogen develop not only in the manure heap but in the soil, and losses may occur in this manner. A carbonaceous residue such as straw in the soil results in a large utilization of nitrogen by bacteria and fungi that rot the straw. There is a good measure of uncertainty, therefore, as to what may happen when nitrogen fertilizer is used. A 10-ton tomato crop uses about 100 pounds of nitrogen, the amount supplied by 500 pounds of sulphate of ammonia. But if crop recovery is excellent and such a yield impossible, it may be necessary to supply more than 700 pounds of sulphate of ammonia to the soil to meet the crop needs for adding 10 tons to the yield. Results will probably be better if the application is broken up and a side-dressing or two is made at appropriate times.

*Reprinted from Better Crops with Plant Food, January, 1946.

There would then be less chance for loss, and more of the nitrogen would go to the tomatoes at critical times in the growth period of the crop.

In the case of potash, the story is somewhat the same. Leaching losses are not usually high, but there is considerable fixation by the soil. At least a part of that fixed by the soil may ultimately become available to crops, but the immediate crop cannot get it. There is the necessity, therefore, to provide more than the amount that is equivalent to the demands of the crop increase that is expected. The same principle applies to all elements which crops need and which must be supplied in the fertilizer that is used.

For Greatest Benefit

An important part of the problem in the use of fertilizers is to use them in such a way that the crop can receive the greatest benefit. A study of methods and time of application has been very helpful in increasing the returns from fertilizers. Such things as keeping the fertilizer off the plants or seed are now pretty well understood. Recent studies have brought out certain advantages of deep application, often designated as "plow-sole" application. By this method, the fertilizer is concentrated in rills in the bottom of plow furrow. The fertilizer is then deep enough to be in moist soil during most of the growing season. In dry years, fertilizer is much more effective when applied deeply. The deep fertilizer may not become effective quite so early in the growth period, but it remains effective, if enough is used, until a good harvest is produced. There is also the minimum of soil fixation where the fertilizer is applied beyond the depth of cultivation. Mixing the soil and fertilizer by cultivation is a contributing cause of high fixation.

The most approved methods of fertilizer application make it possible to use heavy rates safely, whereas the same rates carelessly used might cause more damage than good. One grower is reported to have unwittingly mixed the soil and a large amount of fertilizer. He then set his tomatoes in the fertilized soil. Fortunately the mistake was discovered, but the tomatoes in the much fertilized soil had to be reset. The same fertilizer a few inches away from the plant or on the plow sole probably would have worked well. I have seen excellent beans grown in basement subsoil where liberal fertilizers were applied on the plow sole. Liberal fertilizing also demands an adequate moisture supply if the fertilizer is to be most effective. However, drouth damages are minimized by adequate fertilizing.

Much of the drouth damage is due indirectly to lack of available nitrogen. Most of the organic matter is in the topsoil. Nitrates are produced by breaking down organic matter. Therefore, soils in dry weather are devoid of nitrates because nitrification cannot take place in dry soil. Moisture is necessary for the bacteria which form nitrates. That is why nitrogen fertilizer placed deep enough to be in moist soil is effective in partially overcoming drouth. Or the lawn fertilized in early spring before the drouth comes goes through dry weather better because some reserve of nitrogen has been stored in the root system of the grass and possibly in the deep soil to carry the grass through the dry period.

There are two critically important times in the growth period of the plant. These are when growth starts and again at fruiting time. Booster solutions used on plants that are reset have been helpful in overcoming the shock of resetting. A light application of fertilizer in the row near the plants for seeded crops has proved helpful in giving the crop a good start. Side-dressings used later in the growth period, particularly just before fruiting, contribute to an improved harvest. At no time in the growth period, however, should plants be allowed to suffer because of lack of available nutrients, or both the quality and quantity of crop produced may be disappointing.

It is important to provide by complete fertilization that there be no nutrient deficiency, especially when high value crops are produced. Nitrogen alone may produce an increase, but the increase may be limited because there is not enough available phosphorus, potassium, sulphur, or some other element to support the maximum possible increase. An additional $5 an acre to include potash in the fertilizer program when a $500-per-acre crop is produced is the cheapest insurance against the reduced yields which might result from potash deficiency.

For Most Economy

The economic factor can never be overlooked in deciding upon fertilizer rates. A crop of corn would seldom be worth more than $100 an acre, even with high yields and high prices. A crop of filberts or walnuts, however, may bring more than $500, and a crop of cherries may bring more than $800. Other crops may bring even higher returns. On these crops any amount or kind of fertilizer necessary to get results can be used.

(Continued on page 20)

Fertilizer Results in Mississippi

Summary of Fertilizer Results in Mississippi Experiment Station Annual Report

IN THE Fifty-seventh Annual Report of the Mississippi Agricultural Experiment Station appear the results of a number of fertilizer experiments from which the following are taken:

Nitrogen and Soil Acidity

"Nitrogen fertilizers exert their influence on the chemical make-up of the soil, more than other fertilizers do. Ammonium sulphate, for example, is acid-forming because of both the ammonia and sulphur which it carries. Likewise nitrate of soda and cyanimid exert a basic effect on the soil because of the soda and lime, respectively, which they carry.

"When these fertilizers are used on sandy soils, already low in the mineral nutrients, the character of the fertilizer exerts itself very soon. But with fertile soils, the strongly acid-forming fertilizer, ammonium sulphate, has shown a comparatively small change in acidity in the surface soil after a 20-year period at the Delta Branch Experiment Station.

"When this same soil is transferred to large pots, which prevent the normal exchange of bases in the soil column as under natural conditions, the character of the fertilizer shows up very soon. The sulphate pot becomes quite acid; the cyanimid and nitrate of soda pots become basic with the latter developing a strong tendency to puddle, or run together after rains.

"Under field conditions, where a good winter legume is included in the rotation, these extreme conditions would not occur. This suggests that a farmer who makes heavy yearly applications of nitrogen fertilizers would probably avoid any tendency toward these objectionable characteristics by alternating the sources of nitrogen and including a winter legume occasionally."

Sweet Potatoes

"Tests were conducted at State College of the effect of high and low levels of nitrogen fertilizers in producing seed potatoes upon their keeping quality and sprouting abilities. The results show that nitrogen in the fertilizer had no effect upon the keeping or sprouting.

"Tests of 20 fertilizer treatments for starch sweet potatoes were continued. Results show that an application of 750 pounds to the acre of 6–8–4, plus a top dressing of 100 pounds of a mixture of equal parts of 16 per cent superphosphate and 50 per cent muriate of potash, should be the most profitable for triumph sweet potatoes for starch, on old lands of South Mississippi."

Nitrogen for Delta Soils

"Experiments on sources and rates of applying nitrogen for cotton and corn have been conducted for the past 23 years, and the same experiments on oats have been conducted for 16 years. Experiments comparing fall applications with spring applications of nitrogen for cotton, corn and oats have been investigated since 1937.

"Results of the rates of applying nitrogen experiment with cotton, corn and oats show that profitable increases are obtained when 45 pounds of nitrogen are applied per acre; however, the 30-pound application shows the greater profit per dollar invested in fertilizer.

"In general, the results of the time of applying nitrogen experiment show spring applications to be slightly superior to fall applications.

"The results of an experiment on corn compares the effectiveness of deep application (8 to 12 inches below the seed) of nitrogen with the ordinary method of application, indicate that nitrogen should be applied deeper than is ordinarily done in order to obtain maximum corn yields."

Cotton Experiments at Central Station

"Fertilizer and lime studies for a 7-year period have shown that an annual application of 400 pounds of 4–8–8 and 500 pounds of ground limestone has increased the yield of seed cotton 100 pounds or more per acre as compared with an application of 400 pounds of 4–8–4."

Winter Legumes Versus Commercial Nitrogen

"This test is a continuation of the test started several years ago. It consists of a

(Continued on page 28)

THE AMERICAN FERTILIZER
ESTABLISHED 1894
PUBLISHED EVERY OTHER SATURDAY BY
WARE BROS. COMPANY
1330 VINE STREET, PHILADELPHIA 7, PA.

A Magazine international in scope and circulation devoted exclusively to the Commercial Fertilizer Industry and its Allied Industries

PIONEER JOURNAL OF THE FERTILIZER INDUSTRY

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Vol. 104 MARCH 9, 1946 No. 5

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Farm Storage of Fertilizer

A wartime contribution which it would be well for the fertilizer industry to encourage as a permanent practice, is the early ordering and farm storage of fertilizers.

Perhaps more farmers would have ordered fertilizers early had they suitable storage space on the farm, or had they known that it is possible to store fertilizers on the farm without deterioration of the material.

Some fertilizer companies issued printed matter on storage of fertilizers, likewise the Agricultural Extension Agencies, with the result that more fertilizers have been ordered early and stored on farms than ever before. But there is considerable room for increasing the practice among farmers, and an effort will have to be made to encourage those who are already employing it, to keep it up.

Of course, fertilizers can be successfully stored on the farms and should any be left over from one season, it can be carried over to the next without deteriorating.

Early ordering of fertilizers which fertilizer manufacturers very much desire, goes with educating the farmer on practices that assure safe storage. Simply stated, there must be dry quarters and bags of fertilizers must be dry when stored. Bags of fertilizer must be handled with reasonable care so that none will burst, and if any are burst the fertilizer should be cleaned up and rebagged.

To avoid unnecessary packing and hardening, the farmer must avoid building up the bags into high stacks. If the storage room is kept dry, the fertilizer undergoes very little physical change while in storage and, of course, the plant food content remains unaltered. As inquiries to the farm papers show, this latter fact is not understood by some farmers.

Of course, the above refers to complete fertilizers. Some individual materials that absorb moisture from the air, do tend to harden often requiring crushing before they are applied. To avoid this, moisture-proof bagging is employed. Mixed fertilizers, of course, are not in this class of moisture-absorbing materials and remain comparatively dry in any kind of bagging.

As a means of extending the shipping season and facilitating fertilizer plant operations; also as an assurance to the farmer that he will get all the fertilizers he needs in time for use on his crops, farm storage facilities and early ordering are worth pushing to the limit.

Obituary

Henry McSweeney

Henry McSweeney, president of the United States Potash Company, died at his home in Atlantic City, N. J., on March 5th, at the advanced age of 91 years.

Mr. McSweeney was born in Pittsburgh, Pa., and was the oldest member of the Venango County, Pa., bar to which he was admitted in 1876. He served as president of the United States Potash Company for the past fifteen years and was a large stockholder in the Columbia Gas and Electric Company, the Penn Oil Company, and many other corporations.

He was noted for his extensive charities which included the Lenox Hill Hospital, New York; the Betty Bacharach Home for Afflicted Children, Longport, N. J., and the St. Joseph High School in Oil City, Pa., which he built and donated to the city.

He is survived by his wife, Theresa N. McSweeney.

David Barr Ford

David Barr Ford, president of the Peerless Fertilizer Company, Chestertown, Md., died on February 27th after a brief illness. He was 69 years old.

Mr. Ford was connected with the Peerless Fertilizer Company for more than forty years, serving as secretary and later as vice-president. In 1940 he became president of the company.

He is survived by his wife, a son and a daughter.

National Joint Fertilizer Committee Meets

The combined meeting of the National Joint Committee on Fertilizer Application and the National Joint Committee on Nitrogen Utilization was held at Columbus, Ohio, on February 26th, with an attendance of over 250. Sidney B. Haskell presided.

At the morning session, the following papers were presented: "Trends in Use of Major Plant Foods," M. H. Lockwood, Eastern States Farmers' Exchange; "Twenty Years' Record in Design and Use of Fertilizer Application Machinery," C. H. Zirckel, International Harvester Company; "Some New Ideas on Fertilizer Application Machinery," G. A. Cumings, U. S. Department of Agriculture.

The afternoon session was opened by a talk, "In Retrospect," by Emil Truog of the University of Wisconsin, one of the early workers on fertilizer placement problems. This was followed by a series of six talks, "In Prospect": "Vegetable Crops," V. A. Tiedjens, Virginia; "Field Crops, North," R. E. Yoder, Ohio; "Field Crops, South," Russell Coleman, Mississippi; "Pastures, North," D. R. Dodd, Ohio; "Pastures, South," R. E. Blaser, Florida; "Orchards," M. B. Davis, Ottawa, Canada.

It was voted to combine the work of the two committees into one organization to be known as the National Joint Committee on Fertilizers, with subcommittees working on a subject basis rather than a regional basis.

Officers elected for the coming year were: Chairman, Norman J. Volk, Indiana Agricultural Experiment Station, Lafayette, Ind.; vice-chairman, Jackson B. Hester, Campbell Soup Company, Riverton, N. J.; secretary-treasurer, F. S. Lodge, the National Fertilizer Association, Washington, D. C.

Anderson Asks Revision of 1946 Goals

On February 21st, Secretary of Agriculture Clinton P. Anderson asked farmers to revise their 1946 production plans in order to contribute further to meeting the critical world-wide needs for food. A week earlier Secretary Anderson ordered a re-examination of all production goals in light of the developing world food situation. The new recommendations are based on this review.

Specifically requested are goal increases of 1,000,000 acres of wheat, 1,000,000 acres of corn in the Corn Belt and additional acreages of both corn and grain sorghums in other areas, 1,110,000 acres of soybeans, and 100,000 acres of smooth dry edible peas.

Increases in plantings of wheat, as well as of corn and soybeans, may call for some reduction in acreages of hay, rotation pasture, and oats, and greater utilization of land which otherwise might be left to summer fallow. Inevitably, this will mean a heavy strain on the soil and a delay in farmers' reconversion toward a peacetime pattern of soil management. But the situation calls for a continued all-out production effort. Increases requested in crop acreages should not be accomplished, however, at the expense of flaxseed, sugar beets, or dry beans.

Since winter wheat has already been planted, any increase in this year's wheat acreage will have to take place in the spring wheat area, largely in the four States of North and South Dakota, Montana, and Minnesota. To meet the new goal, each State is

being asked to make every possible effort to increase its former spring wheat goal by 5 per cent or more.

Corn Belt States are asked to accept the major part of the larger corn plantings. Other parts of the country should increase production of feed in accordance with the best use of land to obtain the most feed. This will call for additional acreages of both corn and grain sorghums, particularly in areas where wheat may have been winter killed and the acreage abandoned.

The large increase requested in soybean acreage recognizes the world supply of fats and oils—which is much smaller than expected, the slow movement of supplies from Pacific area sources, and the great relief needs in war-torn countries.

States are being asked to make the following major increases in corn and soybean acreages (in thousand acres):

Corn—Missouri, 300; Iowa, 150; South Dakota, 150; Nebraska, 145; Minnesota, 100; Ohio, 40; Michigan, 30; Illinois, 25; Indiana, 25; and Wisconsin, 25.

Soybeans—Iowa, 200; Ohio, 200; Illinois, 150; Indiana, 150; Minnesota, 100; Missouri, 73; North Carolina, 46; Michigan, 30; Nebraska, 20; Virginia, 20; South Dakota, 15; Kentucky, 15; Kansas, 15; Mississippi, 15; Maryland, 10; Tennessee, 10; Louisiana, 10; Arkansas, 10; others, a total of 21.

Dry peas are a particularly good relief food, since they are high in protein and store and ship well. The 100,000-acre boost proposed for dry smooth peas, bringing the goal up to 500,000 acres, will require increases of about 25 per cent in the goal for each State where the crop is grown.

This year's rye acreage has already been planted. However, because of the extreme shortage of the crop, as well as of other food grains, farmers are urged to allow as much rye as possible to mature for grain.

Although the present goal for rice is very large, a special appeal is directed to growers to plant all the acreage they can this year and thus exceed the goal if at all practicable.

In view of the heavy requirements for milk and its products, shortage of feed concentrates, and the importance of roughage and pasture to the dairy industry, dairymen are asked to push practices which offer the best chance to increase milk production. These practices include greater use of lime and fertilizers, planting more legumes on pasture land, and other approved practices.

Fertilizer Shows High Returns in Missouri Demonstration

A return of $35 for every dollar invested in fertilizer is unusual, to say the least. But that was the difference that a heavy application of fertilizer made on a potato crop grown in Boone County, Mo., this past year.

The demonstration was carried out on the of County Agent T. A. Ewing of near McBaine. The field was in lespedeza pasture the year previously and the soil type was river hill loess.

The varieties of potatoes were seeded, Irish Cobbler and Triumph. The seed was treated and planted on March 9, 1945. All but a few small check plots of the field were fertilized at the rate of 833 pounds of 0–12–12 fertilizer per acre. The fertilized area yielded 333 bushels of potatoes per acre, but the average yield from the check plot was only 98 bushels, or less than one-third as much.

The potatoes from the fertilized plot also graded better, 83 per cent of them being marketed as No. 1. Only 50 per cent of the potatoes in the unfertilized plot graded No. 1.

Considering the increased yield and better quality, the returns from the use of fertilizer amounted to $35.50 for every dollar spent for the fertilizer. Of course, this is better than can be expected on many soils, but fertilizer has consistently paid on Missouri potatos.

BRADLEY & BAKER

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FERTILIZER MATERIALS MARKET

NEW YORK

Tight Situation Continues with No Prospect of Relief for Present Season. Large Shipments by UNRRA with Further Quantites Ordered. Potash Supplies Expected to be Adequate for Domestic Needs

Exclusive Correspondence to "The American Fertilizer"

NEW YORK, March 4, 1946.

The tight supply position continues for all basic fertilizer materials, and there are no new developments to be reported that might lend a feeling of optimism for the immediate future. Fertilizer manufacturers, who are going through their most active period, continue to be concerned about obtaining adequate supplies to meet current demands for mixed fertilizers.

Shipments of fertilizer by UNRRA through the end of 1945 amounted to approximately 106,000 tons of fertilizer, all of which went to liberated areas from the Western Hemisphere. Of this amount, Greece has received the largest allotment.

The two most serious shortages continue to be nitrogen and phosphates, and there appears little hope that suppliers will be able to increase shipments to manufacturers during the heavy seasonal demand.

Export inquiry for all fertilizer materials continues heavy, but shipments to foreign consumers are being made almost entirely through government channels.

Sulphate of Ammonia

With the gradual resumption of activity in the steel industry it will probably be several weeks yet before the extent of damage done as a result of the recent strike can be determined. Meanwhile, ammonium sulphate and the various nitrogen solutions are being shipped as quickly as produced. It is understood that UNRRA has placed an order for 5,000 tons of ammonium sulphate, and at this time is negotiating for an additional 5,000 tons.

Nitrate of Soda

This market remains tight for both domestic and imported, and stocks are being taken as soon as made available. It is generally believed that demand will be met in nearly all areas.

Organic Materials

All organics remain extremely scarce, and there are no offerings for future delivery in evidence. In spite of recent advancement of the ceiling price on castor meal, there has been no easing of the supply situation.

Superphosphate

Continued heavy demand from fertilizer manufacturers has kept stocks at comparatively low levels. Although this market is very firm, it is not anticipated that there will be any serious shortage. A record tonnage of superphosphate was produced during the year of 1945.

Phosphate Rock

During the past week acidulators have called for increasingly heavy shipments of this material, but so far the demand has been met adequately in most areas. There have been no imports of foreign phosphate rock at this port.

Potash

Fertilizer mixers are calling for full fulfillment of contract demands, and there is considerable inquiry on the market for further supplies. Potash stocks are low and no resale lots are available at this time. There is no evident feeling in the trade that supplies of this material will not be adequate through the mixing season.

CHARLESTON

Shortage in Phosphate and Nitrogen Continues. Ceiling on Castor Pomace Raised. UNRRA Requirements Increase.

Exclusive Correspondence to "The American Fertilizer"

CHARLESTON, March 4, 1946.

Organics.—There are still no offerings of any organic material.

Sulphate of Ammonia.—The shortage of this material has been aggravated as 10,000 tons are being requsitioned for UNRRA of which 5,000 tons have already been booked.

Nitrogen Solutions.—It continues very diffi-

Producers of

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Large stocks carried at all times, permitting prompt shipments . . . Uniformly high purity of 99½% or better . . . Free of arsenic, selenium and tellurium.

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cult to get supplies of these materials.

Castor Pomace.—In spite of the recent rise authorized by the OPA in this material, offerings have not appeared and producers are behind in shipments on contracts.

Phosphate Rock.—Sales of this for 1946 and the first half of 1947 continue very heavy.

Superphosphate.—Supplies of this are scarce and it is difficult to find any offering.

PHILADELPHIA

Feed Producers Taking All Organics. Prices on South American Organics Too High for Domestic Use. Materials Market Tight.

PHILADELPHIA, March 4, 1946.

Organic materials formerly used in the manufacture of fertilizers and then diverted to feeds are not now in sufficient supply to satisfy the feeding demand, and the situation has become quite serious from the feeding angle. To make matters worse, many growers are demanding a greater organic percentage in their mixed fertilizers than they used to get when organics were plentiful. It is true that there are offerings of organic materials from South America, but the prices asked are much too high for feeding and consequently entirely out of the question for fertilizer use. Local fertilizer dealers have recently had considerable demand from dairy farmers and stock raisers—not for fertilizers, but for substitutes that might be safely used as a source of protein for feeding.

Sulphate of Ammonia.—Shipments are moving but not in sufficient quantity to supply maximum requirements.

Nitrate of Soda.—Spot wholesale supply is practically nil with no definite information as to when next boat may be expected. This leaves local mixers with scant inventories, and many unfilled inquiries.

Castor Pomace.—There has been some little movement, and while the ceiling price has been advanced, it is not expected that this will lead to any greater supply. Strong demand still exists.

Potash.—Requirements are well ahead of the supply, and there have been offerings to swap certain grades of organics for potash.

Tankage and Blood.—These articles are just not obtainable for fertilizer mixing, but there has been some movement in other directions. It is true, however, that some smaller processors of tankage do continue to sell limited quantities at retail prices to the farmer and grower for direct application or composting.

CHICAGO

Fertilizer Organics Still Extremely Scarce with No Improvement in Sight. Feed Materials at Ceiling Levels.

Exclusive Correspondence to "The American Fertilizer"

CHICAGO, March 4, 1946.

Fertilizer manufacturers are finding the supply of organics and many other ingredients as acute as ever, and therefore trades are limited. Little change for improvement can be seen for the near future.

Ceiling prices for feed materials remain in effect, with most producers allocating their output to old customers.

Government Order M368, which was revoked last October, has been renewed by Order M390, which prohibits the use of chrome leather stock in fertilizer. This order, according to producers of nitrogenous tankage, will seriously reduce the production of this material. It may possibly compel the shut-down of one Midwestern plant, in addition to one which has already closed.

Ceiling prices are:

High grade ground fertilizer tankage, $3.85 to $4.00 ($4.68 to $4.86 per unit N) and 10 cents; standard grades crushed feeding tankage, $5.53 per unit ammonia ($6.72 per unit N); blood, $5.53 ($6.72 per unit N); dry rendered tankage, $1.25 per unit of protein, f. o. b. producing points.

Manufacturers' Sales Agents for **DOMESTIC**

Sulphate of Ammonia

Ammonia Liquor :: Anhydrous Ammonia

HYDROCARBON PRODUCTS CO., INC.

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Soil Conservation Society Formed

Formation of the Soil Conservation Society of America, a professional organization for workers in that and allied fields, is announced by J. H. Christ of Portland, Ore., national secretary-treasurer. The Society enrolled 1,500 members in 1945 and was organized to "promote and advance all phases of the science of conservation of soil and water resources; to provide a medium for exchange of facts, experience and thought; and to present, advance and protect the standards of the science of soil and water conservation." Dr. Hugh H. Bennett of Washington, D. C., chief of the Soil Conservation Service, U. S. D. A., is founder of the Society.

Southwest Fertilizer Conference

About 120 attended the Arkansas, Louisiana, Oklahoma, Texas Fertilizer Conference and School at Shreveport on February 5th and 6th, sponsored by the industry, control officials, and agronomists. C. D. Shallenberger presided and in closing expressed the opinion that it was the best meeting ever held in that area. In making recommendations for cotton and corn, Dr. R. P. Bartholomew of Arkansas, Drs. E. B. Reynolds and P. R. Johnson and M. K. Thornton of Texas, Dr. F. L. Davis and Dawson Johns of Louisiana, and Dr. H. J. Harper of Oklahoma pointed out that the increased need for nitrogen and potash in older soils indicated the desirability of grades of the 1–1–1 ratio like 8–8–8 with variations for different soil types and rotations. R. A. Wasson, Louisiana extension agronomist, reported that 108 corn demonstrations in 1945 showed an average yield of 48.1 bushels corn per acre, from the use of 49 pounds of nitrogen, 32 pounds of phosphoric acid, and 45 pounds of potash, an increase of 51 per cent over unfertilized.

J. R. Cooper and Dr. V. M. Watts of Arkansas, W. H. Friend, R. E. Wright, and P. R. Johnson of Texas, and D. C. Alderman of Louisiana presented results on fertilizing fruit and truck crops which indicated the desirability of more emphasis on complete fertilizers like 4–12–4, 4–12–8, and 5–10–5 for fruits, plus additional nitrogen, rather than nitrogen alone. Farmers in these States seldom apply as much fertilizer as the truck crops need, especially of grades like 8–8–8 or others high in potash. In the Rio Grande Valley, grades high in nitrogen and phosphoric acid were recommended.

(*Continued on Page 20*)

CASE HISTORY No. 3

in a series of factual experiences of a group of American manufacturers with Multiwall Paper Bags.

COST COMPARISON

	100 lb. Osnaburg	100 lb. Paper Bags
Container Cost	.150	.068
Container Cost per 100 lbs.	.150	.068
Labor Cost	.014	.006
Total Cost per 100 lbs.	.164	.074
Savings per 100 lbs. Paper over Fabric		.090
Saving per ton Paper over Fabric		1.80

DETAILS OF LABOR COST

	Production per hour	Cost Per 100 lbs.
100 lbs. Osnaburg		
8 men filling		
6 men weighing, closing, and handling	60,000 lbs.	.014
(average wage rate 60c per hour)		
100 lb. Paper (6 valve bag Packers)		
6 men filling		
6 men handling	120,000 lbs.	.006
(average wage rate 60c per hour)		

CLASS OF PRODUCT PACKED

CEMENT	FERTILIZER
CHEMICALS	FOOD
FEEDSTUFFS ✓	MISCELLANEOUS

PRODUCT CHARACTERISTICS

ABRASIVE ✓	GRANULAR ✓
CORROSIVE	HEAVY ✓
DELIQUESCENT	HYGROSCOPIC
FLUFFY	LIGHT
FREE-FLOWING ✓	VISCOUS

ST. REGIS BAG PACKAGING SYSTEMS are made in a variety of capacities, speed, and manpower requirements to suit specific products and plant layouts. Machines are available in types to meet the special characteristics of a wide range of products, with filling speeds as high as twenty-four 100-lb. bags per minute — with one operator.

A BRIGHT LIGHT AT A DARK MOMENT

Stone Mountain Grit Co., Lithonia, Ga., faced with heavy demand for grit to increase egg production, was bottle-necked by slow packaging and a severe shortage of osnaburg bags. With a packaging crew of 14 men, production averaged only 150 one hundred lb. bags per hour from each of 4 spouts — a total of 600 bags per hour. 6 St. Regis packers to fill multiwall paper bags were installed, and operated in pairs. With a crew of 12 instead of 14 men, production went up to 200 bags per hour per machine — a total of 1200 bags per hour . . . from 60,000 to 120,000 lbs. per hour.

Production Per Man Hour More Than Doubled

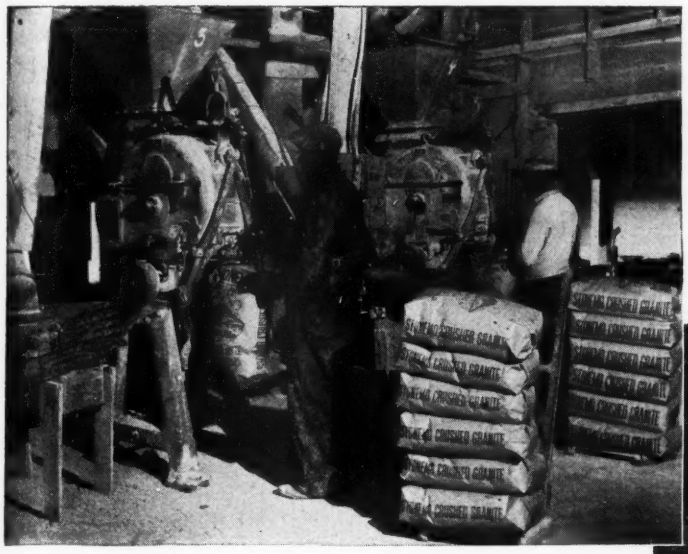
With the St. Regis system, 12 men packed 120,000 lbs. per hour, or 10,000 lbs. per man hour; equivalent to 130% increase of output per man hour, and easier and pleasanter jobs for the entire crew.

Container Costs More Than Halved

The hard-to-get osnaburg bags cost him $150 per thousand, Multiwall paper valve bags cost him $68.40 per thousand. His container costs were reduced by 54.6%.

Consumer Acceptance

Sift-proof paper valve bags assured dust-free, full weight containers which customers readily accepted in place of the former fabric containers.



(Left) A pair of the St. Regis packers in the Stone Mountain Grit Co. plant at Lithonia, Ga.

(Below) Sift-proof Multiwall paper bags are handled easily.

St. Regis MULTIWALL PAPER

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Without obligation, please send me full details regarding "Case History" No. 3, outlined above.

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For rice, Dr. L. C. Kapp of Arkansas, Dr. E. B. Reynolds and E. A. Miller of Texas stressed the need of nitrogen on old soils and phosphoric acid on new soils, with application preferable to dry soil. R. K. Walker of Louisiana recommended 200 to 400 pounds of 4–12–8, 6–9–6, 6–8–8, or 5–10–5 on sandy soils and 8–8–8 on clay loams, placed two inches below the seed at planting time, in a rotation with improved pastures. Dr. J. F. Fudge and R. R. Lancaster of Texas, Dr. M. B. Sturgis and D. L. Bornman of Louisiana, and others stressed more adequate fertilization of pastures and hay crops from the standpoint of higher quality feed production and better land utilization.

Dr. W. J. Peevy of Louisiana, in addition to other speakers, urged the use of about 300 pounds of 5–10–10 or 4–8–8 plus 30 pounds of nitrogen for oats on lighter soils, and heavier amounts of nitrogen alone on heavy soils or in a well fertilized rotation. For grazing oats or other cereals, early planting and heavier fertilization were recommended. Dr. C. F. Simmons of Louisiana, reporting on 15 tests with sugar cane in 1945, said that heavy rates of nitrogen bring on a response to potash and phosphorus as well and that something like 500 pounds of 8–8–8 may be suggested in the future for all but alluvial land. About 300 pounds of 4–12–4 were suggested for Arkansas sugar cane and sorghum, with additional nitrogen as side dressing.

George Suggs and Frank R. Curtis talked briefly on the nitrogen supplies; B. E. Meguschar on phosphate supplies and production, and J. W. Rutland on potash conditions. C. B. Spencer of Dallas urged a correlation of soil improvement efforts and J. B. Snell thanked the College workers for the very comprehensive program. R. H. Lush spoke on pasture fertilization.

Bemis Buys Indiana Plant

The property of the Indiana Cotton Mills at Cannelton, Ind., has been sold to interests representing the Bemis Bro. Bag Co., Mr. Lee Rodman, president, has announced. A new company is being organized to operate the plant.

Transfer is to be made as of April 1, 1946, without interrupting operation of the mill. The new company expects to continue operations and retain present personnel. Mr. Rodman, who is retiring from the active management, expressed the hope that the new company may have the continued support and cooperation of all present employees and the citizens of Cannelton.

Fertilizer Legislation

Mississippi

A bill, H. R. 279, introduced in the Mississippi legislature, would amend the present law by making it possible for fertilizer manufacturers to apply to the Commissioner of Agriculture for a permit to make quarterly reports as to the tons of each grade of fertilizer or fertilizer materials they ship and to pay an inspection fee of 20 cents a ton on each ton shipped in lieu of applying an inspection stamp on each package. Penalties are provided for failure to file reports and for other infractions of the law. The bill has passed the House of Representatives.

Virginia

A bill, House Bill 124, has been introduced in the legislature of Virginia which would make some notable changes in the fertilizer law of that state. Among other provisions, the Commissioner of Agriculture, by and in agreement with the Director of the Virginia Agricultural Experiment Station at Blacksburg, and the Director of the Virginia Truck

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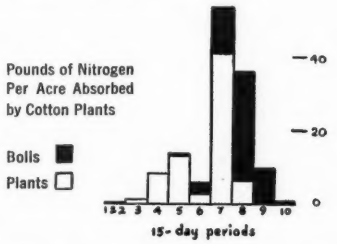
Does your fertilizer have the patience to grow cotton?

COTTON requires a lot of nitrogen—but two-thirds of all the nitrogen it needs for full growth isn't absorbed until the fourth month.

Here's the way cotton plants absorb nitrogen, according to the Georgia Experiment Station:



This means that the nitrogen fertilizer applied at or before planting has to resist leaching for over three months—and *then* be available to the plants in large quantities.

Your fertilizer fits the crop when you use Urea Nitrogen

Urea nitrogen resists losses from leaching because of unique chemical changes that occur in the soil. Yet, unlike other leaching-resistant forms of nitrogen, urea is completely available to the plants.

That's why your fertilizer is ideally suited to cotton when you use urea nitrogen. You'll find that Du Pont UREA-AMMONIA LIQUORS give you a low-cost source of nitrogen and quick-curing mixtures that store well, drill well and have low acid reaction in the soil.

To meet the varying requirements of manufacturers, Du Pont supplies four UREA-AMMONIA LIQUORS and URAMON Fertilizer Compound. For further information, write E. I. du Pont de Nemours & Co. (Inc.), Ammonia Department, Wilmington 98, Delaware.

BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

NITROGEN THAT FITS THE CROP

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Fertilizer Compound

Experiment Station at Norfolk, and after a hearing of which all registered fertilizer manufacturers are notified, would adopt from time to time the number of grades of mixed fertilizers which may be sold, the number to be not less than 15 nor more than 25. The bill also provides that guarantees as to whether acid-forming or non-acid forming shall be in multiples of 5 per cent, and that the plant food content shall be at least 16 per cent.

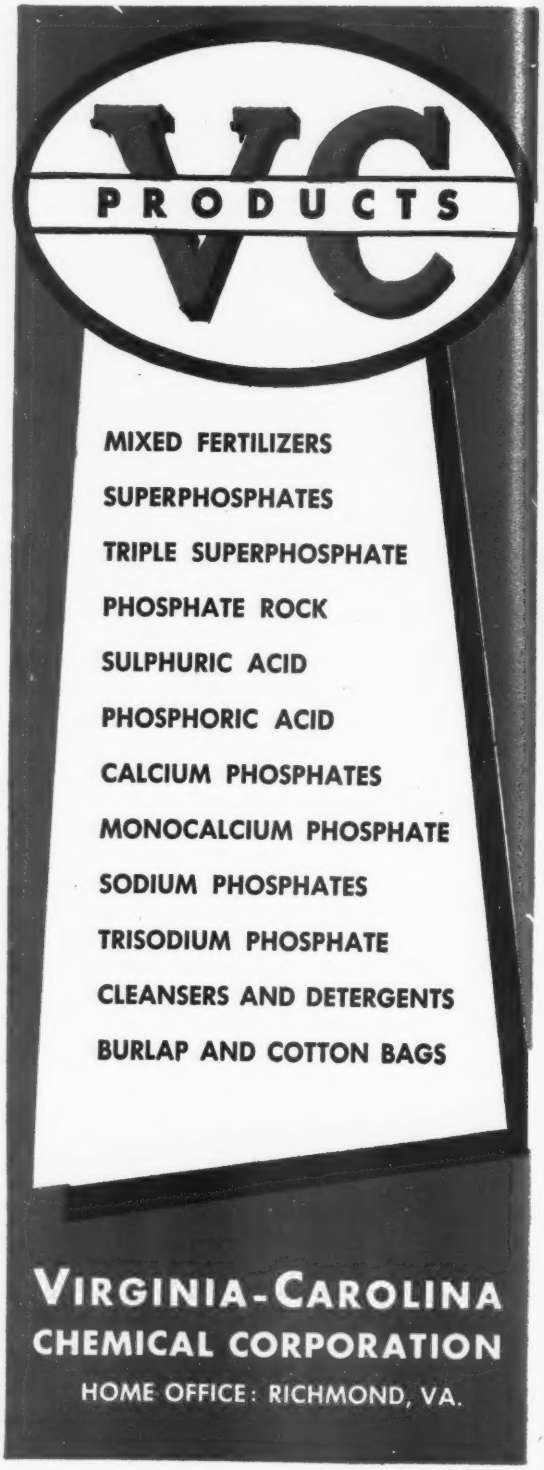
The bill also provides minimum and maximum guarantees for borax. Additional plant food materials, determined by chemical control methods, may be guaranteed only by permission of the Commissioner of Agriculture. When such additional plant food elements or compounds are included in the guarantee they shall be subject to inspection and analysis in accordance with the approved methods of analysis of the Association of Official Agricultural Chemists. The Commissioner, with the approval of the State Board of Agriculture, may fix the penalty for failure to fulfill the guarantees.

The bill has passed both Houses of the Legislature and has gone to the Governor for approval.

Three-Part Grass Spray is New U. S. D. A. Idea

Combining a weed killer, a fertilizer and a fungicide in solution for single application to grass and possible other crops begins to look like a feasible short cut, say scientists of the U. S. Department of Agriculture's Research Administration. Working at the Plant Industry Station, Beltsville, Md., Dr. P. C. Marth and Dr. J. W. Mitchell tried out as a grass spray mixtures of the hervicide, 2,4-D, the nitrogen fertilizer urea, and the fungicide Fermate. They learned, for one thing, that the weed killer is no worse for the grass when used aongwith the fertilizer, or with the fertilizer and fungicide, than when used alone.

Previous experiments at the Plant Industry Station had shown that the 2,4-D in concentration strong enough to kill weeds (1½ parts to 1,000) sharply cut down the rate of growth of an established mixture of Kentucky bluegrass, fescue and redtop. It was a logical move to try to overcome the drawback of retarded growth by making the grass grow faster later and by protecting it against damage by fungi. The experimenters added urea, a common source of nitrogen, and Fermate, a well-known fungicide. As no grass in the test was under attack by any fungus disease the use of Fermate was simply to



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"PROPERLY DRESSED FOR THE OCCASION!"

In HAMMOND MULTI-WALL BAGS you get the ideal combination of attractive appearance and rugged construction that quickly wins the approval of fertilizer users.

HAMMOND strong kraft multi-wall bags are made in Sewn and Pasted Valve and Open Mouth styles, and are available with asphalt laminated plies.

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THREE ELEPHANT
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. . . . WHEN BORON IS NEEDED TO CORRECT A DEFICIENCY OF THIS IMPORTANT SECONDARY ELEMENT

Agricultural authorities have shown that a lack of Boron in the soil can result in deficiency diseases which seriously impair the yield and quality of crops.

When Boron deficiencies are found, follow the recommendations of local County Agents or State Experiment Stations.

Information and references available on request.

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See Page 4

discover whether its presence would make the mixture bad for the grass.

August application of 2,4-D solution, with enough urea to provide 60 pounds to the acre, made the grass a strong green color within a few days and the weed-killing power of the 2,4-D was as good as when used alone. As a result of killing the weeds and feeding the turf, the yield of valuable herbage increased 40 to 131 per cent during two months. However, when the grass got 90 pounds of urea to the acre along with the 2,4-D solution it was severely injured for a time.

So far only a part of the fungicide factors have been uncovered, but it has been shown that the presence of Fermate does not interfere with weed-killing, nor with the fertilizing. More tests will show whether or not the fungicide in the three-part spray will kill fungi as well as when used alone.

Marth and Mitchell say their results give good reasons to expect a more economical method of doing these three jobs in the growing of grass and small grain and possibly some other close-growing crops not readily damaged by 2,4-D.

Nitrogen and Phosphorus Increase Yields in Kentucky

How the use of ammonium nitrate increased production in Hickman county, Kentucky, is told by Farm Agent Warren Thompson.

Waller Gore doubled the grazing for his sheep on a field of redtop and timothy by applying 100 pounds of ammonium nitrate, and E. C. Whayne fed 24 head of stock on 20 acres of redtop, lespedeza and timothy after applying a similar amount.

Ode Mullins produced 27 bushels of wheat per acre where he applied 200 pounds of 47 per cent superphosphate and three tons of lime, as against 12 bushels of wheat on untreated land. Grover Wyatt increased barley production to 31 bushels per acre where he applied 200 pounds of 47 per cent superphosphate and two tons of lime. Where he had not treated the soil, his yield was 20 bushels per acre.

One of the most successful producers of orchard grass seed in Logan county last year, according to Farm Agent John R. Watlington, was Earl Hughes who demonstrated in a 35-acre field the value of ammonium nitrate.

On March 1st, Hughes applied 75 pounds of ammonium nitrate per acre to two and a half acres, his yield of orchard grass seed being 15 bushels to the acre. In early April, he applied 100 pounds of the fertilizer per acre to 30 acres, his crop being 20 bushels of seed to the acre. The remaining two and a half acres which were not treated yielded seven bushels per acre. Mr. Hughes reported that the amount of pasture was in proportion to the fertilizer used and the seed produced.

W. K. Woods, Jr., To Join Chase Bag Staff

F. H. Ludington, president of the Chase Bag Company, has announced that Woodson K. Woods, Jr., will join the Chase Bag Company, commencing May 1, 1946. Mr. Woods formerly was associated with the Ralston Purina Company in their Cereal Department, and for several years prior to that time was Manager, Merchandise Department, of the Checkerboard Elevator Company (subsidiary of the Ralston Purina Company).

After becoming fully acquainted with the Chase Bag Company operations and with all matters of Chase Bag Company policy, Mr. Woods will serve in an executive capacity with P. S. Forthmann, Manager of the St. Louis Branch of the Chase Bag Company.

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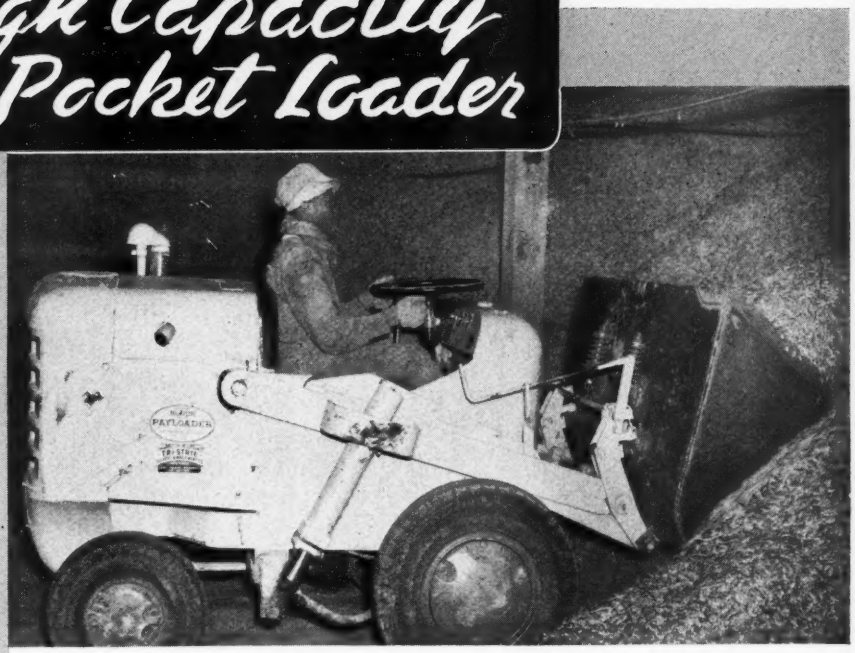
CUTS CURING TIME — NEUTRALIZES ACIDITY
For helpful free book of fertilizer formulating sheets write... American Cyanamid Co. — Fertilizer Division, 30 Rockefeller Plaza, New York 20, New York.

A High Capacity Vest Pocket Loader



The Hough Model "HA" Payloader completely fulfills the need of the fertilizer industry for a compact, readily maneuverable loader for handling bulk materials economically. The "HA" Payloader is the result of many years of development work and exhaustive operating tests. It has already proved itself in nearly a hundred fertilizer plants.

Maneuverability reaches a new high with this unit. It loads and operates with ease and thoroughness in and out of a box car, the overall width is only 49", the wheel base 48½" and the turning radius only 6'6". One man with the "HA" Payloader loads bulk material, carries it 100 feet and dumps it at a rate of 25 to 50 tons per hour. It will do the work of 8 to 10 men.

The "HA" Payloader is a rugged powerful tractor unit—not an attachment for a tractor. Power is furnished by a heavy duty 4 cylinder 29 H.P. engine. Two speeds forward and two reverse provide ample flexibility and speed of movement. The bucket is hydraulically actuated by twin cylinders and has the exclusive tip-back feature which prevents spillage.

The Model "HA" Payloader is the material handling unit you have been waiting for. There are over 3500 Hough Loaders in service.

Write for full information.
We have a Distributor near you.

THE FRANK G. HOUGH CO.
Libertyville, Illinois . "Since 1920"

HOUGH Payloader SHOVELS

Personal Mention

G. Webber Knight has been appointed manager of the Washington, D. C., Office of the Pennsylvania Salt Company. This office will act as a clearing house in all Company matters involving domestic and foreign government agencies. Mr. Knight has been with the Company for twenty-one years in managerial positions.

Dave Meeker, formerly of the USDA and War Food Administration dealing with fertilizer and farm supplies, is now manager of education for Harry Ferguson, Inc., Detroit, Mich., a manufacturer of farm machinery.

Bruce D. Cloaninger, head of the Department of Fertilizer Inspection and Analysis of the Clemson Experiment Station, has returned to his duties in that department after having served nearly four years in the Armed Services.

Wilson and George Meyer and Company announce the return of *Lieutenant Colonel John Bacon* from the Army to their San Francisco office and the appointment of *Captain Lloyd A. Reeks, Jr.*, U. S. Air Corps, and *Lieutenant Commander George W. Vaughan*, U. S. N. R., to their Los Angeles office. *Lieutenant Ralph S. Waltz*, U. S. N. R., has been added to the staff of the San Francisco office, and *Lieutenant John A. Foster*, U. S. Air Corps, to the Seattle office.

Dr. Karl C. Hamner, with the Bureau of Plant Industry from 1935 to 1940 and since then a member of the staff at Ithaca, has been appointed director of the Regional Plant, Soil and Nutrition Laboratory at Ithaca, N. Y., to suceed Dr. L. A. Maynard who has returned to full-time duty with Cornell University.

Allen B. Lemmon has been named Chief of the Bureau of Chemistry, California State Department of Agriculture. Mr. Lemmon entered the State service in 1933 as an inspector of economic poisons and fertilizers, Bureau of Chemistry. He has been acting in charge of the Bureau since the retirement of the former chief.

C. W. Kitchen, assistant administrator of the Production and Marketing Administration, and connected with the Department of Agriculture for 34 years, became executive vice-president of the United Fresh Fruit and Vegetable Association, Washington, D. C., on February 21st.

Dr. Charles H. Mahoney, head, Department of Horticulture, University of Maryland, will become head of the *National Canners Association's Raw Products Bureau* on April 1st, to succeed Dr. Charles G. Woodbury who is retiring on a consulting advisory basis.

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Advertisements for sale of plants, machinery, etc., and for help and employment in this column, same type as now used, 60 cents per line, each insertion.

WANTED to purchase—outright or controlling interest in going fertilizer business. Address "170," care THE AMERICAN FERTILIZER, Philadelphia 7.

FOR SALE

FOR SALE—Two dry mix fertilizer plants, best East Texas locations. Now running, will deliver in June. PITTSBURG COTTON OIL CO., Pittsburg, Texas

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Founded 1834
Dependable for Fifty Years
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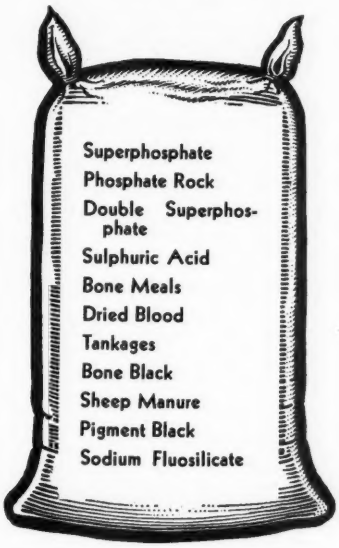

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Armour's
BIG CROP
FERTILIZERS

FERTILIZER RESULTS IN MISSISSIPPI

(Continued from page 11)

300-pound mixture of 6–8–4 vs. 0–8–4 plus hairy vetch; 0–8–4 plus crimson clover and 0–8–4 plus Austrian peas.

"It has been difficult to get a good stand of bur clover and Austrian peas each year. The 6–8–4 with commercial nitrogen has increased the yield of seed cotton about 200 pounds more per acre than the nitrogen from the legumes."

Peanuts

"The experimental work with peanuts shows that excellent peanuts can be obtained on brown loam soils. Peanuts did not show much response to fertilizers. The greatest increase in pounds per acre was received from the 4–8–8 plots. There were 1,030 pounds of nuts per acre, compared with 830 pounds from the no fertilizer plots, and 3,660 pounds of hay from the 4–8–8 plots compared with 2,700 pounds from unfertilized plots."

Sugar Cane

"In the fertilizer test it has been shown that from 800 to 1,000 pounds of a complete fertilizer such as 6–8–4 applied in two applications is sufficient. The first application of about 500 pounds should be made when the cane is knee high and the second application of from 300 to 500 pounds when the cane is waist high. The nitrogen in the above fertilizer should be from either cottonseed meal or ammonium sulphate."

Tung Oil Trees

"In the fertilizer analysis test, indications are that phosphorus is a limiting factor in the production of tung oil nuts. When phosphorus was used in combination with nitrogen the production of nuts increased approximately four and one-half times over nitrogen alone, in these young trees. The phosphorus also increased the oil content of the nuts about one per cent.

"In the fertilizer rates test, using 8–8–4 at the rate of one-fourth, one-half and one pound per tree per year's growth, one-fourth pound has produced as many nuts as the one-half pound application, at the end of the third year. One pound of 8–8–4 produced 211 pounds of nuts per acre; whereas one-half pound produced 173 pounds of nuts."

Peas

"Fertilizer tests conducted this year confirm previous reports that 800 to 100 pounds of 5–10–5 plus 100 pounds of nitrate of soda applied as a side dressing is the most economical fertilizer to use with peas."

Cabbage

"Fertilizer data collected from several years of experimental work with different grades and amounts show that applications of 1,000 to 1,200 pounds of 6–8–4 is the most economical fertilizer to use."

Corn Responses

"Experiments conducted throughout the state have shown that corn must be fertilized with nitrogen in order to produce the most profitable yield. Nitrogen may be applied effectively to corn either under the crop or as a side-dressing. In either case it should be applied at the rate of at least 32 pounds per acre (200 pounds of nitrate of soda or 100 pounds of ammonium nitrate). Each pound of actual nitrogen will normally produce one-half bushel more than unfertilized corn, and each dollar invested in nitrogen fertilizer will produce a profit of $4.00 to $5.00 at the present price of corn."

It Pays to Fertilize in Texas

"It pays to fertilize" is an excellent slogan for farmers in parts of Texas where use of fertilizers has shown increased acreage production of farm crops. E. A. Miller, agronomist for the Texas A. and M. College Extension Service, believes that fertilizer is a profitable investment at present prices for food, feed and fiber crops. Tests at experiment stations and demonstrations by county agricultural agents have proved it.

He explains that proper use of commercial fertilizers on the sandy soils and sandy loams of the eastern half of Texas, on the Wilson and Crockett soils of central and south Texas, and on the heavy soils of the Gulf Coast is necessary to obtain the largest production.

Yields of cotton have been increased 60

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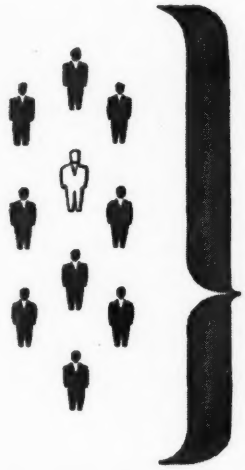

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A recent survey reveals that 90% of the employees who have purchased billions of dollars of these bonds through the Payroll Savings Plan, *want* the Plan continued! And it should be continued because it provides a strong reservoir of national savings and a bulwark against inflation—an "automatic" thrift habit for the worker—an opportunity to maintain a "share in America"—and an opportunity for the returned veteran to share the Payroll Plan's benefits.

Your employees will require little "selling" on the idea—they are accustomed to their monthly saving habit. With the Treasury Department's savings bond program now in peacetime operation, your partnership is again invited to continue this systematic, convenient saving program toward a prosperous peacetime future.

to 100 pounds of lint an acre by application of 400 pounds an acre of fertilizer on experiment sub-stations at Tyler, Nacogdoches, Angleton and College Station. Although corn and grain sorghums have not shown increases in the same proportion fertilizers can be used profitably on these crops.

For cotton, Miller recommends 300 to 400 pounds of 5–10–5 or 6–8–4 an acre in East Texas except on soils where cotton rust and wilt prevail. On those soils, fertilizers high in potash such as 4–8–8 and 8–8–8 should be used. In the Gulf Coastal prairie the same amounts of 6–12–0 on the heavy black soils and 6–8–4 on sandy soil are most suitable.

For corn and grain sorghums in the east Texas timber country and Gulf Coastal, prairie fertilizers high in nitrogen are best suited. These include 6–8–4 and 5–10–5 at the rate of 200 to 400 pounds an acre before or at planting time. These should be supplemented with 100 pounds of ammonium nitrate or 200 pounds an acre of nitrate of soda about forty-five days after planting. On drier sandy soil in the West Cross Timbers and Rio Grande plain about one-half as much fertilizer an acre is recommended as in the more humid region of the state.

THE FERTILIZER RATE PROBLEM

(Continued from page 10)

Some orchardists in citrus areas have spent $100 an acre for fertilizer. The same expenditure on corn or wheat might be twice the total value of the crop. A fertilizer trial on filberts showed enough increase that the returns from one year would pay the cost of adequate fertilization for several years to come. An increase sufficient to return a profit for one year is acceptable to the farmer.

How much fertilizer to use then must be decided after considering many factors. Present yields are usually known within certain limitations. A 50-per-cent increase from adequate fertilization is a reasonable expectation. Doubling the yield is not impossible. We have more than quadrupled cover crop yields with fertilizers used in orchards. We have under favorable conditions increased the yields of nuts and fruits by 50 per cent.

The element of time must be given due consideration in planning the fertilizer program. Some crops are harvested six weeks after planting, and some may require more than six months. Orchards may not begin to bear for six years and may still be in production at sixty years. On early vegetables, fertilizer response is immediate if at all. On an orchard that is run down, a minimum of three to five years may be required to build enough vitality into the tree to show a response at harvest time. It is a very different problem then to fertilize a plant that grows from a tiny seedling to harvest in six weeks and fertilizing a stunted and starved tree which already has made a relatively enormous but inadequately nourished growth. These factors are particularly important influences that govern expected fertilizer responses.

In deciding on fertilizer rates, two major factors must be kept in mind. How many bushels, pounds, or tons are a reasonable expectation to add to the present average yield of crops? Then, after making due allowance for soil fixation and various other factors that affect crop yields so far as they can be anticipated, enough of the various known deficient elements with some margin of safety to produce the hypothetical crop increase that appears reasonable should be provided. Seldom perhaps will full expectations be realized, but the method is less haphazard than the entirely too common practice of applying whatever amount or kind of fertilizer may be conveniently obtained. After consideration of the possible fertilizer needs to produce a good crop increase, due consideration must be given to the value of the increase. If 10 bushels can be added to a 20-bushel wheat yield, a relatively small fertilizer application is all that is economically justified. If, on the other hand, 5 tons can be added to a 10-ton yield of green beans while the price is more than $100 per ton, the cost of the fertilizer can be forgotten. All that is needed then is the courage to go out and apply what common sense and one's best judgment signify should be used. With adequate attention to proven information relative to fertilizer rates and usage, much increased production and considerable increase in profits could be added to the present level of production and income.

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A Classified Index to Advertisers in "The American Fertilizer"

BUYERS' GUIDE

For an Alphabetical List of all the Advertisers, see page 33

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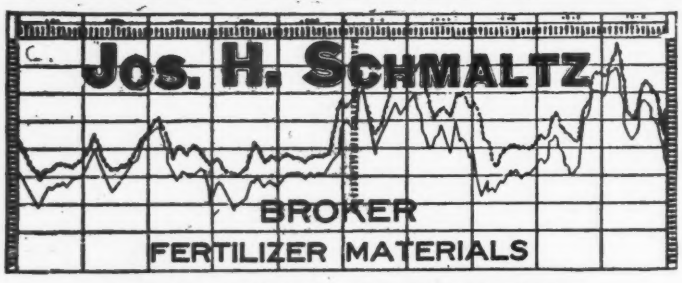

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